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inclination of the orbit-plane remains unknown. The minimum orbit capable of satisfying the observed velocities corresponds to the case of the orbit-plane passing through the observer. In this case, the maximum distance between the two components would be about 85,000,000 kilometers; and, if ELKIN'S value of the parallax of *Capella*, 0".08, is correct, the angular separation of the components, as viewed from the solar system, would approximate 0".045 when passing through the nodes. Such an orbit would give rise to eclipses every fifty-two days. No variations in the brightness of *Capella* having been observed, it is said to assume that the orbit-plane makes an appreciable angle with the line of sight.

In the case of a great number of orbit-planes distributed fortuitously, the most probable value of the angle between the normal to the orbit-plane and the line of sight would be 60°. The corresponding angular separation of the components at the nodal points would be about 0".052. In case this angle should be 30°, the corresponding separation would be 0".09.

The question as to whether *Capella* could be observed as an ordinary double star early arose. It was most carefully examined with the 36-inch refractor on several occasions in 1900 and 1901 by Messrs. HUSSEY and AITKEN, and on one occasion by Mr. PERRINE; but neither duplicity nor elongation could be detected. Their observations were made under the most favorable conditions, and we may conclude that the angular separation of the components is less than 0".06.

A discussion of the probable masses of the components with reference to the mass of our Sun seems to be futile, on account of the impossibility of harmonizing the best available data for the parallax and brightness of *Capella*, the brightness of our Sun and the angular separation of the components.

1901, July 25. W. W. CAMPBELL.

A DETERMINATION OF THE ORBIT OF *CAPELLA*.

[ABSTRACT.]*

The computation is based on the thirty-one observations of the velocity in the line of sight of the solar-type component given in the preceding note. The method of computing the orbit is exactly that given by LEHMANN-FILHÉS (*A. N.* 3242), except that in the equations of condition the correction to the velocity of the center of mass of the system is introduced as a sixth unknown, with coefficient unity. The period, 104.1 days, was assumed as best agreeing with the observations, and the observed velocities were plotted as functions of the time interval after the next preceding minimum, assuming September 18.9, 1899, as a time of minimum. A smooth curve was drawn through the points so obtained, and by means of a planimeter the line representing the velocity of the center of mass of the system was drawn so as to inclose equal areas with the portions of the curve above it and below it. The other requisite quantities were then obtained in the way shown in the article already cited. From the set of provisional elements thus found, an ephemeris was computed after first combining certain of the observations in pairs so as to form in all twenty-seven normal places. From the residuals derived by comparing the observations with this ephemeris, equations of condition were set up and solved in the usual manner.

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* The complete paper is printed in Lick Observatory *Bulletin*, No. 6.

The probable error of a single observation was found to be ± 0.50 kilometers per second. The final values of the elements with their probable errors are:—

$\mu = 0.060403$	± 0.000014 radians
$\omega = 117^\circ.3$	$\pm 18^\circ.3$
$T = -17.4$ days	± 5.3 days, the actual date being Sept. 1.5, 1899
$e = +0.0164$	± 0.0055
$K = 25.76$	± 0.12
$U = 104.022$ days	± 0.024 days
$a \sin i = 36{,}847{,}900$ kilometers	
$V = +30.173$	± 0.104 kilometers per second

The great uncertainty in the values of ω and T is due to the fact that the orbit is nearly circular. The probable errors of the other quantities are small in view of the difficulty in measuring the spectrum of this star.

It will be recalled that VOGEL and SCHEINER photographed the spectrum of this star from October 6, 1888, to September 15, 1889, but failed to detect its binary character, their spectroscope being apparently incapable of resolving its composite spectrum. By carrying back the period of 104.022 days to 1888 and 1889, their observations can be compared with the orbit. It is found that their plate, number 19, was taken at a time when the relative velocity of the two components was about zero. This plate they marked "excellent." Four other plates, numbered respectively 14, 15, 18, and 67, and marked "very good," "good," etc., were taken at times when the velocity of the solar component relative to the center of mass was nine kilometers or less. One plate, number 95, is marked as rather poor except for a good Hγ line, although the velocity of the solar component relative to the center of mass was only six kilometers. With this exception all plates marked "verwaschen," "uncertain," etc., were taken when the relative velocity of the two components was very large, and therefore the two spectra were very much separated, so as to cause a blurring of the composite spectrum.

JULY 25, 1901. H. M. REESE.

SCIENTIFIC VISITORS TO THE LICK OBSERVATORY.

The Lick Observatory was favored with visits from the following persons, returning to their homes from the Sumatra eclipse stations: —

F. W. DYSON, Esq., F. R. S., Chief Assistant in the Royal Observatory, Greenwich.

Dr. W. T. HUMPHREYS, of the Department of Physics, University of Virginia.

Dr. GILBERT, of the Department of Physics, Lehigh University.

Professor Dr. A. A. NIJLAND, Director of the Observatory, Utrecht, Holland.

Dr. J. H. WILTERDINK, Astronomer in the Royal Observatory, Leiden, Holland.

Professor and Mrs. D. P. TODD, of Amherst College.

W. W. C.

ASTRONOMICAL TELEGRAMS.

(Translation.)

CAMBRIDGE, MASS., Aug. 6, 1901.

To Lick Observatory: (Received Aug. 7, 9 P.M.)

WILSON, at Northfield, Minn., telegraphs that he observed ENCKE'S periodic comet on its return on August 5.8924 G. M. T. in R. A. $6^h\ 2^m\ 2^s.8$; Decl. $+ 31^\circ\ 42'\ 30''$.

(Signed) E. C. PICKERING.

[A cablegram from Kiel, giving a sweeping ephemeris of ENCKE'S comet computed by THONBERG was received at the Lick Observatory on August 5, 1901, at 4 P. M.]